What is claimed is:

1. A biodegradable polyphosphate having at least one phosphate group in the main chain of the polymer and the polymer having at least one positively charged or positively chargeable group and at least one hydrophobic moiety.

2. A polymer of claim 1, wherein the polymer is amphiphilic.

3. A polymer of claim 1, wherein the polymer has a net positive charge.

4. A polymer of claim 1 wherein the polymer is biocompatible before, during and upon biodegredation.

5. A polymer of claim 1, wherein the positively charged groups are integral to the main chain of the polymer or are present in a phosphate side chain group.

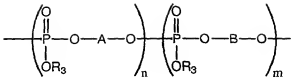
6. A polymer of claim 1, wherein the hydrophobic moieties are groups pendant from the polymer main chain and each hydrophobic group is linked to a phosphate group or a charged group that is integral to the main-chain of the polymer.

7. A polymer of claim 1 further comprising a hydrophilic group which can be neutral or charged, the hydrophilic group either can be integral to the polymer main chain or can be a pendant group that is linked to the main chain.

8. A polymer of claim 1, wherein the biodegradable polymer has between about 5 and about 2,000 phosphate groups in the backbone.

9. A polymer of claim 1, wherein the biodegradable polymer has a molecular weight of between about 1000 and 1,000,000.

10. A polymer of claim 1 wherein the polymer comprises repeat units of the formula:



wherein

A and B can be the same or different and are each independently selected from the group consisting of $C_{1-20}$alkylene, $C_{3-20}$cyclic alkylene, $C_{5-20}$arylene, $C_{5-20}$heteroarylene, $C_{3-20}$cyclic heteroalkylene, a hydrophilic divalent linker group, and $(CH_2CH_2O)_xCH_2CH_2$, such that A, B or both A and B comprise a positively charged or positively chargeable functional group in the mainchain and A, B or both A and B can be optionally substituted with one or more neutral or charged hydrophilic groups or hydrophobic groups;

$R_3$ is $C_{1-20}$alkyl, $C_{5-20}$aryl, $C_{5-20}$heteroaryl, $C_{3-8}$heteroalicyclic, $C_{3-8}$cycloalkyl, $C_{7-20}$aralkyl or $C_{3-8}$cycloalkyl $C_{1-20}$alkyl; and

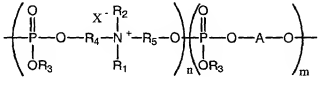
each occurrence of $R_3$ can be optionally substituted with one or more neutral or charged groups or one or more hydrophobic moieties;

x is an integer between about 1 and about 100;

m and n are independently selected non-negative integers; and

$m + n \geq 1$.

11. A polymer of claim 10, wherein the polymer comprises repeat units according to the formula:



wherein

$R_4$, $R_5$ and A are each independently chosen from the group consisting of $C_{1-20}$alkylene, $C_{3-20}$cycloalkylene, divalent neutral or charged hydrophilic moieties, -$(CH_2CH_2O)_xCH_2CH_2$-;

x is an integer from 1 to about 100;

$R_1$ is hydrogen, $C_{1-36}$alkyl, $C_{2-36}$alkenyl, $C_{2-36}$alkynyl, $C_{3-20}$cycloalkyl, $C_{3-8}$cycloalkyl$C_{1-36}$alkyl, $C_{7-18}$aralkyl, $C_{3-20}$heteroalicyclic, or $(CH_2)_a$-Y-Z group;

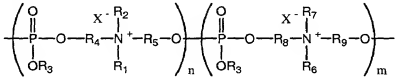
Y is an -O-, $-CO_2-$, $-NHCO_2-$, or $-OCO_2-$ functional group;

Z is $C_{1-36}$alkyl, $C_{2-36}$alkenyl, $C_{2-36}$alkynyl, $C_{3-20}$cycloalkyl, $C_{3-8}$cycloalkyl$C_{1-36}$alkyl, $C_{7-18}$aralkyl, poly(ethylene glycol)- $C_{1-36}$alkyl ether or a steroid derivative;

$R_2$ is absent, hydrogen, $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, or $C_{3-8}$cycloalkyl $C_{1-36}$alkyl; and

$X^-$ is a biocompatible anion.

12. A polymer of claim 11, wherein the polymer comprises repeat units according to the formula:



wherein

$R_4$, $R_5$, $R_8$ and $R_9$ are independently selected at each occurrence from the group consisting of $C_{1-36}$alkylene, $C_{5-36}$cycloalkylene, and poly(ethyleneglycol) alkyl ether, each occurrence of $R_4$, $R_5$, $R_8$ and $R_9$ can be optionally substituted with a neutral or charged hydrophilic group selected from the group consisting of hydroxyl, hydroxy $C_{1-8}$alkyl, amino $C_{1-8}$alkyl, N- $C_{1-8}$alkyl amino $C_{1-8}$alkyl, N,N-di $C_{1-8}$alkyl amino $C_{1-8}$alkyl, amino, N- $C_{1-8}$alkylamino, N,N,di $C_{1-8}$alkylamino, N,N,N-tri $C_{1-8}$alkylamino, amide, carboxylate, sulfate, and phosphate;

$R_2$ and $R_7$ are each independently at each occurrence either absent or are selected from the group consisting of hydrogen, $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, and $C_{3-8}$cycloalkyl $C_{1-36}$alkyl;

$R_3$ is $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, or $C_{3-8}$cycloalkyl $C_{1-36}$alkyl;

$R_1$ and $R_6$ are each independently selected groups chosen at each occurrence from the group consisting of hydrogen, $C_{1-36}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

Z is alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

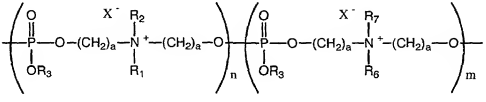
$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen and $C_{1-6}$alkyl;

b is a positive integer;

$m+n \geq 1$; and

$n \geq 1$.

13. A polymer of claim 11, wherein the polymer comprises repeat units according to the formula:



wherein

$R_2$ and $R_7$ are each independently selected at each occurrence to be absent, hydrogen or $C_{1-20}$alkyl;

$R_1$ and $R_6$ are each independently selected at each occurrence to be hydrogen, $C_{1-36}$alkyl or $(CH_2)_b$-$N(R_{10})CO_2$-Z;

$R_{10}$ is independently chosen at each occurrence to be hydrogen or $C_{1-6}$alkyl;

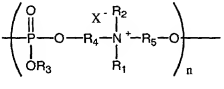
Z is independently chosen at each occurrence of Z to be alkyl, $(CH_2CH_2O)_xCH_2CH_3$ or a steroid derivative;

a is an positive integer;

b is a positive integer; and

x is an integer from about 1 to about 20.

14. A polymer of claim 1, wherein the polymer comprises repeat units according to the formula:



wherein

$R_1$ is independently selected groups chosen at each occurrence from the group consisting of hydrogen, $C_{1-36}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

Z is $C_{1-36}$alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

$R_2$ is independently selected at each occurrence to be absent, hydrogen, or a $C_{1-36}$alkyl;

$R_3$ is $C_{1-36}$alkyl;

$R_4$ and $R_5$ are each independently chosen from the group consisting of $C_{1-36}$alkylene, $C_{3-36}$cycloalkylene, divalent neutral or charged hydrophilic moieties, $-(CH_2CH_2O)_xCH_2CH_2$;

$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen and $C_{1-6}$alkyl;

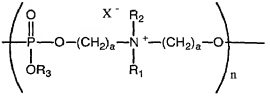
x is an integer from about 1 to about 100;

$X^-$ is a biocompatible anion;

b is a positive integer; and

n is an integer between about 5 and about 2,000.

15. A polymer of claim 14, wherein the polymer comprises repeat units according to the formula:



wherein

$R_2$ and $R_3$ are each independently selected $C_{1-6}$alkyl groups;

$R_1$ is independently selected groups chosen at each occurrence from the group consisting of $C_{8-24}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

Z is $C_{1-36}$alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen, methyl and ethyl;

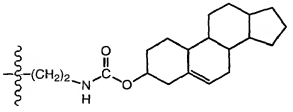
$X^-$ is a biocompatible anion;

a is an positive integer;

b is a positive integer; and

n is an integer between about 5 and about 2,000.

16. A polymer of claim 15, wherein $R_1$ is a group according to the formula



wherein the steroid ring structure can optionally be substituted at one or more steroid ring atoms with one or more substitutents chosen from the group consisting of $C_{1-12}$alkyl, $C_{2-12}$alkenyl, $C_{2-12}$alkynyl, and $C_{3-8}$cycloalkyl and two or more substitutents can combine to form additional carbocyclic or heteroalicyclic rings which can be fused or spiro to the steroid ring structure; or

$R_1$ is $-(CH_2)_2NHCO_2-R$, wherein R is a straight chain alkyl group having from about 10 to about 24 carbon atoms.

17. A biodegradable polymeric micelle comprising a biodegradable, amphiphilic polyphosphate having at least one phosphate group in the main chain of the polymer and the polymer having at least one positively charged or positively chargeable group and at least one hydrophobic moiety.

18. A micelle of claim 17, wherein the positively charged groups are integral to the main chain of the polymer or are present in a phosphate side chain group.

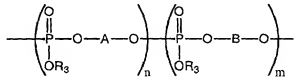
19. A micelle of claim 17, wherein the hydrophobic moieties are groups pendant from the polymer main chain and each hydrophobic group is linked to a phosphate group that is integral to the main chain.

20. A micelle of claim 17, wherein the micelles have a diameter of about 50 nm to about 500 nm.

21. A micelle of claim 17, wherein the micelle can further comprise one or more negatively charged or neutral biologically active substances.

22. A micelle of claim 21, wherein the negatively charged or neutral biologically active substances are selected from the group consisting of DNA, RNA, proteins, and small molecule therapeutics.

23. A micelle of claim 17, wherein the polymer comprises repeat units of the formula:



wherein

A and B can be the same or different and are each independently selected from the group consisting of $C_{1\text{-}20}$alkylene, $C_{3\text{-}20}$cyclic alkylene, $C_{5\text{-}20}$arylene, $C_{5\text{-}20}$heteroarylene, $C_{3\text{-}20}$cyclic heteroalkylene, a hydrophilic divalent linker group, and $(CH_2CH_2O)_xCH_2CH_2$-; such that A, B or both A and B comprise a positively charged or positively chargeable functional group in the mainchain and A, B or both A and B can be optionally substituted with one or more neutral or charged hydrophilic groups or hydrophobic groups;

$R_3$ is $C_{1\text{-}20}$alkyl, $C_{5\text{-}20}$aryl, $C_{5\text{-}20}$heteroaryl, $C_{3\text{-}8}$heteroalicyclic, $C_{3\text{-}8}$cycloalkyl, $C_{7\text{-}20}$aralkyl or $C_{3\text{-}8}$cycloalkyl $C_{1\text{-}20}$alkyl; and

each occurrence of $R_3$ can be optionally substituted with one or more neutral or charged groups or one or more hydrophobic moieties;

x is an integer between about 1 and about 100;

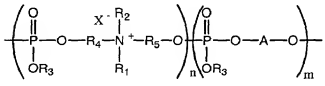
m and n are independently selected non-negative integers; and

$m + n \geq 1$.

24. A micelle of claim 23, wherein the micelle further comprises at least one negatively charged or neutral biologically active substance selected from the group consisting of DNA, RNA, proteins, and small molecule therapeutics.

25. A micelle of claim 24, wherein the micelle further comprises at least one negatively charged or neutral biologically active substance selected from the group consisting of DNA, RNA, proteins, and small molecule therapeutics.

26. A micelle of claim 23, wherein the polymer comprises repeat units according to the formula:



wherein

$R_4$, $R_5$ and A are each independently chosen from the group consisting of $C_{1-20}$alkylene, $C_{3-20}$cycloalkylene, divalent neutral or charged hydrophilic moieties, $-(CH_2CH_2O)_xCH_2CH_2-$;

x is an integer from 1 to about 100;

$R_1$ is hydrogen, $C_{1-36}$alkyl, $C_{2-36}$alkenyl, $C_{2-36}$alkynyl, $C_{3-20}$cycloalkyl, $C_{3-8}$cycloalkyl$C_{1-36}$alkyl, $C_{7-18}$aralkyl, $C_{3-20}$heteroalicyclic, or $(CH_2)_a$-Y-Z group;

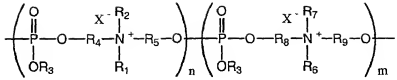
Y is an -O-, $-CO_2-$, $-NHCO_2-$, or $-OCO_2-$ functional group;

Z is $C_{1-36}$alkyl, $C_{2-36}$alkenyl, $C_{2-36}$alkynyl, $C_{3-20}$cycloalkyl, $C_{3-8}$cycloalkyl$C_{1-36}$alkyl, $C_{7-18}$aralkyl, poly(ethylene glycol)- $C_{1-36}$alkyl ether or a steroid derivative;

$R_2$ is absent, hydrogen, $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, or $C_{3-8}$cycloalkyl $C_{1-36}$alkyl; and

$X^-$ is a biocompatible anion.

27. A micelle of claim 23, wherein the polymer comprises repeat units according to the formula:



wherein

$R_4$, $R_5$, $R_8$ and $R_9$ are independently selected at each occurrence from the group consisting of $C_{1-36}$alkylene, $C_{5-36}$cycloalkylene, and poly(ethyleneglycol) alkyl ether, each occurrence of $R_4$, $R_5$, $R_8$ and $R_9$ can be optionally substituted with a neutral or charged hydrophilic group selected from the group consisting of hydroxyl, hydroxy $C_{1-8}$alkyl, amino $C_{1-8}$alkyl, N- $C_{1-8}$alkyl amino $C_{1-8}$alkyl, N,N-di $C_{1-8}$alkyl amino $C_{1-8}$alkyl, amino, N- $C_{1-8}$alkylamino, N,N,di $C_{1-8}$alkylamino, N,N,N-tri $C_{1-8}$alkylamino, amide, carboxylate, sulfate, and phosphate;

$R_2$ and $R_7$ are each independently at each occurrence either absent or are selected from the group consisting of hydrogen, $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, and $C_{3-8}$cycloalkyl $C_{1-36}$alkyl;

$R_3$ is $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, or $C_{3-8}$cycloalkyl $C_{1-36}$alkyl;

$R_1$ and $R_6$ are each independently selected groups chosen at each occurrence from the group consisting of hydrogen, $C_{1-36}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

Z is alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen and $C_{1-6}$alkyl;

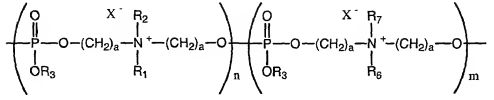
b is a positive integer;

$m+n \geq 1$; and

$n \geq 1$.

28. A micelle of claim 27, wherein the micelle further comprises at least one negatively charged or neutral biologically active substance selected from the group consisting of DNA, RNA, proteins, and small molecule therapeutics.

29. A micelle of claim 23, wherein the polymer comprises repeat units according to the formula:



wherein

$R_2$ and $R_7$ are each independently selected at each occurrence to be absent, hydrogen or $C_{1\text{-}20}$alkyl;

$R_1$ and $R_6$ are each independently selected at each occurrence to be hydrogen, $C_{1\text{-}36}$alkyl or $(CH_2)_b$-$N(R_{10})CO_2$-Z;

$R_{10}$ is independently chosen at each occurrence to be hydrogen or $C_{1\text{-}6}$alkyl;

Z is independently chosen at each occurrence of Z to be alkyl, $(CH_2CH_2O)_xCH_2CH_3$ or a steroid derivative;

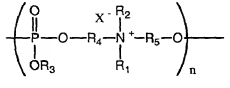
a is an positive integer;

b is a positive integer; and

x is an integer from about 1 to about 20.

30. A micelle of claim 29, wherein the micelle further comprises at least one negatively charged or neutral biologically active substance selected from the group consisting of DNA, RNA, proteins, and small molecule therapeutics.

31. A micelle of claim 17, wherein the polymer comprises repeat units according to the formula:



wherein

$R_1$ is independently selected groups chosen at each occurrence from the group consisting of hydrogen, $C_{1\text{-}36}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

Z is $C_{1-36}$alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

$R_2$ is independently selected at each occurrence to be absent, hydrogen, or a $C_{1-36}$alkyl;

$R_3$ is $C_{1-36}$alkyl;

$R_4$ and $R_5$ are each independently chosen from the group consisting of $C_{1-36}$alkylene, $C_{3-36}$cycloalkylene, divalent neutral or charged hydrophilic moieties, $-(CH_2CH_2O)_xCH_2CH_2$;

$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen and $C_{1-6}$alkyl;

x is an integer from about 1 to about 100;

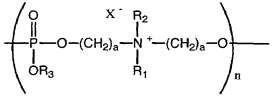
$X^-$ is a biocompatible anion;

b is a positive integer; and

n is an integer between about 5 and about 2,000.

32. A micelle of claim 31, wherein the micelle further comprises at least one negatively charged or neutral biologically active substance selected from the group consisting of DNA, RNA, proteins, and small molecule therapeutics.

33. A micelle of claim 31, wherein the polymer comprises repeat units according to the formula:



wherein

$R_2$ and $R_3$ are each independently selected $C_{1-6}$alkyl groups;

$R_1$ is independently selected groups chosen at each occurrence from the group consisting of $C_{8-24}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

Z is alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen, methyl and ethyl;

$X^-$ is a biocompatible anion;

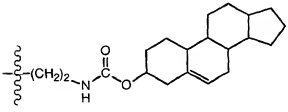
a is an positive integer;

b is a positive integer; and

n is an integer between about 5 and about 2,000.

34. A micelle of claim 33, wherein the micelle further comprises at least one negatively charged or neutral biologically active substance selected from the group consisting of DNA, RNA, proteins, and small molecule therapeutics.

35. A micelle of claim 34, wherein $R_1$ is a group according to the formula



wherein the steroid ring structure can optionally be substituted at one or more steroid ring atoms with one or more substitutents chosen from the group consisting of $C_{1\text{-}12}$alkyl, $C_{2\text{-}12}$alkenyl, $C_{2\text{-}12}$alkynyl, and $C_{3\text{-}8}$cycloalkyl and two or more substitutents can combine to form additional carbocyclic or heteroalicyclic rings which can be fused or spiro to the steroid ring structure; or

$R_1$ is $-(CH_2)_2NHCO_2-R$, wherein R is a straight chain alkyl group having from about 10 to about 24 carbon atoms.

36. A micelle of claim 35, wherein the micelle further comprises at least one negatively charged or neutral biologically active substance selected from the group consisting of DNA, RNA, proteins, and small molecule therapeutics.

37. A method of preparing a biodegradable amphiphilic polyphosphate having at least one phosphate group in the main chain of the polymer and the polymer having at least one positively charged group and at least one hydrophobic moiety, the method comprising the steps of:

providing at least one diol monomer and at least one phosphate precursor monomer; and

reacting the diol monomer(s) and phosphate precursor monomer(s) under conditions conducive to the formation of a biodegradable amphiphilic polyphosphate.

38. A method of claim 37, wherein the diol monomer(s) and phosphate precursor(s) react via a polycondensation polymerization reaction to form the biodegradable amphiphilic polyphosphate.

39. A method of claim 37, herein the method comprises the steps of:

providing diol monomers, HO-A-OH and HO-B-OH, and a phosphate precursor $(R_3O)(Hal)_2P{=}O$, wherein

A and B can be the same or different and are each independently selected from the group consisting of $C_{1\text{-}20}$alkylene, $C_{3\text{-}20}$cyclic alkylene, $C_{5\text{-}20}$arylene, $C_{5\text{-}20}$heteroarylene, $C_{3\text{-}20}$cyclic heteroalkylene, a hydrophilic divalent linker group, and $(CH_2CH_2O)_xCH_2CH_2$-; such that A, B or both A and B comprise a positively charged or positively chargeable functional group in the mainchain and A, B or both A and B can be optionally substituted with one or more neutral or charged hydrophilic groups or hydrophobic groups;

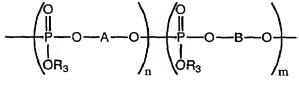
x is an integer from about 1 to about 100;

$R_3$ is $C_{1\text{-}20}$alkyl, $C_{5\text{-}20}$aryl, $C_{5\text{-}20}$heteroaryl, $C_{3\text{-}8}$heteroalicyclic, $C_{3\text{-}8}$cycloalkyl, $C_{7\text{-}20}$aralkyl or $C_{3\text{-}8}$cycloalkyl $C_{1\text{-}20}$alkyl;

each occurrence of $R_3$ can be optionally substituted with one or more neutral or charged groups or one or more hydrophobic moieties; ; and

Hal is chloride, bromide, iodide or sulfonate;

reacting the diol monomers with the phosphate precursors under conditions conducive to a polycondensation polymerization reaction to generate a biodegradable amphiphilic polyphosphate of the formula:

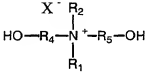


wherein

m and n are independently selected non-negative integers; and

$m + n \geq 1$.

40. A method of claim 39, wherein diol monomer HO-B-OH is a monomer of the formula



wherein

$R_4$ and $R_5$ are each independently chosen from the group consisting of $C_{1-20}$alkylene, $C_{3-20}$cycloalkylene, divalent neutral or charged hydrophilic moieties, -$(CH_2CH_2O)_xCH_2CH_2$-;

x is an integer from 1 to about 100;

$R_1$ is hydrogen, $C_{1-36}$alkyl, $C_{2-36}$alkenyl, $C_{2-36}$alkynyl, $C_{3-20}$cycloalkyl, $C_{3-8}$cycloalkyl$C_{1-36}$alkyl, $C_{7-18}$aralkyl, $C_{3-20}$heteroalicyclic, or $(CH_2)_a$-Y-Z group;

Y is an -O-, -$CO_2$-, -$NHCO_2$-, or -$OCO_2$- functional group;

Z is $C_{1-36}$alkyl, $C_{2-36}$alkenyl, $C_{2-36}$alkynyl, $C_{3-20}$cycloalkyl, $C_{3-8}$cycloalkyl$C_{1-36}$alkyl, $C_{7-18}$aralkyl, poly(ethylene glycol)- $C_{1-36}$alkyl ether or a steroid derivative;

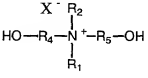
$R_2$ is absent, hydrogen, $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, or $C_{3-8}$cycloalkyl $C_{1-36}$alkyl; and

x is an integer from about 1 to about 100;

b is a positive integer; and

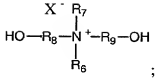
$X^-$ is a biocompatible anion.

41. A method of claim 39, wherein diol monomer, HO-B-OH is a monomer of the formula:



; and

diol monomer HO-A-OH is a monomer of the formula



wherein

$R_4$, $R_5$, $R_8$ and $R_9$ are independently selected at each occurrence from the group consisting of $C_{1-36}$alkylene, $C_{5-36}$cycloalkylene, and poly(ethyleneglycol) alkyl ether, each occurrence of $R_4$, $R_5$, $R_8$ and $R_9$ can be optionally substituted with a neutral or charged hydrophilic group selected from the group consisting of hydroxyl, hydroxy $C_{1-8}$alkyl, amino $C_{1-8}$alkyl, N- $C_{1-8}$alkyl amino $C_{1-8}$alkyl, N,N-di $C_{1-8}$alkyl amino $C_{1-8}$alkyl, amino, N- $C_{1-8}$alkylamino, N,N,di $C_{1-8}$alkylamino, N,N,N-tri $C_{1-8}$alkylamino, amide, carboxylate, sulfate, and phosphate;

$R_2$ and $R_7$ are each independently at each occurrence either absent or are selected from the group consisting of hydrogen, $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, and $C_{3-8}$cycloalkyl $C_{1-36}$alkyl;

$R_3$ is $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, or $C_{3-8}$cycloalkyl $C_{1-36}$alkyl;

$R_1$ and $R_6$ are each independently selected groups chosen at each occurrence from the group consisting of hydrogen, $C_{1-36}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

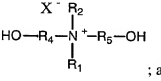
Z is alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen and $C_{1-6}$alkyl; and

b is a positive integer.

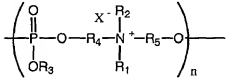
42. A method of claim 37, wherein the method comprises the steps of:

providing a phosphate precursor, $(R_3O)(Hal)_2P=O$, and a diol monomer of the formula:



; and

reacting the diol monomer and the phosphate precursor under conditions conducive to the formation of a biodegradable polymer of the formula



wherein

$R_1$ is independently selected groups chosen at each occurrence from the group consisting of hydrogen, $C_{1\text{-}36}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_a$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

Z is $C_{1\text{-}36}$alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

$R_2$ is independently chosen at each occurrence to be absent, hydrogen or $C_{1\text{-}36}$alkyl;

$R_3$ is $C_{1\text{-}20}$alkyl;

$R_4$ and $R_5$ are each independently chosen from the group consisting of $C_{1\text{-}20}$alkylene, $C_{3\text{-}20}$cycloalkylene, divalent neutral or charged hydrophilic moieties, $-(CH_2CH_2O)_xCH_2CH_2-$;

$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen and $C_{1\text{-}6}$alkyl;

$X^-$ is a biocompatible anion;

x is an integer from about 1 to about 100;

a is an positive integer; and

n is an integer between about 5 and about 2,000.

43. A method of preparing a biodegradable amphiphilic polyphosphate micelle, the method comprising the steps of:

providing a biodegradable amphiphilic polyphosphate having at least one phosphate group in the main chain of the polymer and the polymer having at least one positively charged or positively chargeable group and at least one hydrophobic moiety; and

agitating a colloidal suspension of the polymer in a biphasic solution to obtain micelles having a diameter of between about 50 nm and 500 nm.

44. A method of preparing a biodegradable micelle composition comprising a biodegradable amphiphilic polyphosphate micelle and a biologically active substance, the method comprising the steps of:

providing at least one biodegradable amphiphilic polyphosphate micelle and at least one biologically active substance; and

contacting the micelle with the biologically active substance under conditions conducive to the inclusion of at least a portion of the biologically active substances into the micelles resulting in a biodegradable micelle composition comprising a biologically active substance.

45. A method for the controlled release of a biologically active substance comprising the steps of:

providing a biodegradable amphiphilic polyphosphate micelle composition comprising:

(a) at least one biologically active substance; and

(b) a biodegradable amphiphilic polyphosphate micelle having at least one phosphate group in the main chain of the polymer and the polymer having at least one positively charged or positively chargeable group and at least one hydrophobic moiety;

contacting the micelle composition *in vivo* or *in vitro* with a biological fluid, cell or tissue under conditions conducive to the delivery of at least a portion of the biologically active substance to the biological fluid, cell or tissue so that the biologically active substance is released in a controlled manner.

46. A method of claim 45, wherein the biologically active substance is released *in vivo*.

47. A method of claim 45, wherein the biologically active substance is released *in vitro*.

48. A method of claim 45, wherein the biologically active substance is released extracellularly.

49. A method of claim 45, wherein the biologically active substance is released intracellularly.

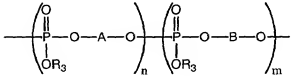
50. A method of claim 45, wherein the biologically active substance(s) are selected from the group consisting of DNA, RNA, proteins, and small molecule therapeutics.

51. A method of claim 45, wherein the biodegradable polymer has between about 5 and about 2,000 phosphate groups.

52. A method of claim 45, wherein the biodegradable polymer has a molecular weight of between about 1000 and 1,000,000

53. A method of claim 45, wherein the biologically active substance is selected from the group consisting of DNA, RNA, proteins, and small molecule therapeutics.

54. A method of claim 45, wherein the polymer comprises repeat units of the formula:



wherein

A and B can be the same or different and are each independently selected from the group consisting of $C_{1\text{-}20}$alkylene, $C_{3\text{-}20}$cyclic alkylene, $C_{5\text{-}20}$arylene, $C_{5\text{-}20}$heteroarylene, $C_{3\text{-}20}$cyclic heteroalkylene, a hydrophilic divalent linker group, and $(CH_2CH_2O)_xCH_2CH_2$, such that A, B or both A and B comprise a positively charged or positively chargeable functional group in the mainchain and A, B or both A and B can be optionally substituted with one or more neutral or charged hydrophilic groups or hydrophobic groups;

$R_3$ is $C_{1-20}$alkyl, $C_{5-20}$aryl, $C_{5-20}$heteroaryl, $C_{3-8}$heteroalicyclic, $C_{3-8}$cycloalkyl, $C_{7-20}$aralkyl or $C_{3-8}$cycloalkyl $C_{1-20}$alkyl; and

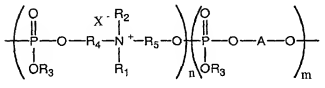
each occurrence of $R_3$ can be optionally substituted with one or more neutral or charged groups or one or more hydrophobic moieties;

x is an integer between about 1 and about 100;

m and n are independently selected non-negative integers; and

$m + n \geq 1$.

55. A method of claim 54, wherein the polymer comprises repeat units according to the formula:



wherein

$R_4$, $R_5$ and A are each independently chosen from the group consisting of $C_{1-20}$alkylene, $C_{3-20}$cycloalkylene, divalent neutral or charged hydrophilic moieties, -$(CH_2CH_2O)_xCH_2CH_2$-;

x is an integer from 1 to about 100;

$R_1$ is hydrogen, $C_{1-36}$alkyl, $C_{2-36}$alkenyl, $C_{2-36}$alkynyl, $C_{3-20}$cycloalkyl, $C_{3-8}$cycloalkyl$C_{1-36}$alkyl, $C_{7-18}$aralkyl, $C_{3-20}$heteroalicyclic, or $(CH_2)_a$-Y-Z group;

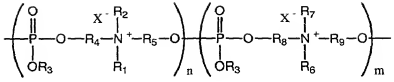
Y is an -O-, -$CO_2$-, -$NHCO_2$-, or -$OCO_2$- functional group;

Z is $C_{1-36}$alkyl, $C_{2-36}$alkenyl, $C_{2-36}$alkynyl, $C_{3-20}$cycloalkyl, $C_{3-8}$cycloalkyl$C_{1-36}$alkyl, $C_{7-18}$aralkyl, poly(ethylene glycol)- $C_{1-36}$alkyl ether or a steroid derivative;

$R_2$ is absent, hydrogen, $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, or $C_{3-8}$cycloalkyl $C_{1-36}$alkyl; and

$X^-$ is a biocompatible anion.

56. A method of claim 54, wherein the polymer comprises repeat units according to the formula:



wherein

$R_4$, $R_5$, $R_8$ and $R_9$ are independently selected at each occurrence from the group consisting of $C_{1-36}$alkylene, $C_{5-36}$cycloalkylene, and poly(ethyleneglycol) alkyl ether, each occurrence of $R_4$, $R_5$, $R_8$ and $R_9$ can be optionally substituted with a neutral or charged hydrophilic group selected from the group consisting of hydroxyl, hydroxy $C_{1-8}$alkyl, amino $C_{1-8}$alkyl, N- $C_{1-8}$alkyl amino $C_{1-8}$alkyl, N,N-di $C_{1-8}$alkyl amino $C_{1-8}$alkyl, amino, N- $C_{1-8}$alkylamino, N,N,di $C_{1-8}$alkylamino, N,N,N-tri $C_{1-8}$alkylamino, amide, carboxylate, sulfate, and phosphate;

$R_2$ and $R_7$ are each independently at each occurrence either absent or are selected from the group consisting of hydrogen, $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, and $C_{3-8}$cycloalkyl $C_{1-36}$alkyl;

$R_3$ is $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, or $C_{3-8}$cycloalkyl $C_{1-36}$alkyl;

$R_1$ and $R_6$ are each independently selected groups chosen at each occurrence from the group consisting of hydrogen $C_{1-36}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

Z is alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

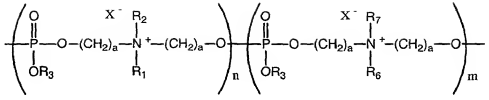
$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen and $C_{1-6}$alkyl;

b is a positive integer;

$m+n \geq 1$; and

$n \geq 1$.

57. A method of claim 54, wherein the polymer comprises repeat units according to the formula:



wherein

$R_2$ and $R_7$ are each independently selected at each occurrence to be absent, hydrogen or $C_{1\text{-}20}$alkyl;

$R_1$ and $R_6$ are each independently selected at each occurrence to be hydrogen, $C_{1\text{-}36}$alkyl or $(CH_2)_b$-$N(R_{10})CO_2$-Z;

$R_{10}$ is independently chosen at each occurrence to be hydrogen or $C_{1\text{-}6}$alkyl;

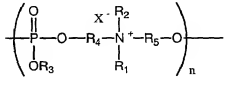
Z is independently chosen at each occurrence of Z to be alkyl, $(CH_2CH_2O)_xCH_2CH_3$ or a steroid derivative;

a is an positive integer;

b is a positive integer; and

x is an integer from about 1 to about 20.

58. A method of claim 45, wherein the polymer comprises repeat units according to the formula:



wherein

$R_1$ is independently selected groups chosen at each occurrence from the group consisting of hydrogen, $C_{1\text{-}36}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

Z is $C_{1\text{-}36}$alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

$R_2$ is independently selected at each occurrence to be absent, hydrogen, or a $C_{1\text{-}36}$alkyl;

$R_3$ is $C_{1\text{-}36}$alkyl;

$R_4$ and $R_5$ are each independently chosen from the group consisting of $C_{1-36}$alkylene, $C_{3-36}$cycloalkylene, divalent neutral or charged hydrophilic moieties, -$(CH_2CH_2O)_xCH_2CH_2$;

$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen and $C_{1-6}$alkyl;

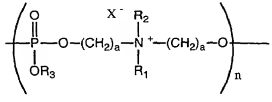
x is an integer from about 1 to about 100;

$X^-$ is a biocompatible anion;

b is a positive integer; and

n is an integer between about 5 and about 2,000.

59. A method of claim 58, wherein the polymer comprises repeat units according to the formula:



wherein

$R_2$ and $R_3$ are each independently selected $C_{1-6}$alkyl groups;

$R_1$ is independently selected groups chosen at each occurrence from the group consisting of $C_{8-24}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is -$OCO_2$- or -$NR_{10}CO_2$-;

Z is $C_{1-36}$alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen, methyl and ethyl;

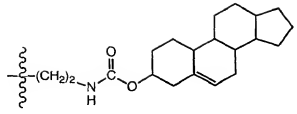
$X^-$ is a biocompatible anion;

a is an positive integer;

b is a positive integer; and

n is an integer between about 5 and about 2,000.

60. A micelle of claim 59, wherein $R_1$ is a group according to the formula



wherein the steroid ring structure can optionally be substituted at one or more steroid ring atoms with one or more substitutents chosen from the group consisting of $C_{1-12}$alkyl, $C_{2-12}$alkenyl, $C_{2-12}$alkynyl, and $C_{3-8}$cycloalkyl and two or more substitutents can combine to form additional carbocyclic or heteroalicyclic rings which can be fused or spiro to the steroid ring structure; or

$R_1$ is $-(CH_2)_2NHCO_2-R$, wherein R is a straight chain alkyl group having from about 10 to about 24 carbon atoms.

61. A method for gene therapy, the method comprising the steps of:

providing a biodegradable amphiphilic polyphosphate micelle composition comprising:

(a) at least a portion of at least one gene; and

(b) a biodegradable amphiphilic polyphosphate micelle having at least one phosphate group in the main chain of the polymer and the polymer having at least one positively charged or positively chargeable group and at least one hydrophobic moiety;

contacting the micelle composition *in vivo* or *in vitro* with a biological fluid, cell or tissue under conditions conducive to the delivery of at least a portion of the gene to the biological fluid, cell or tissue such that gene therapy occurs.

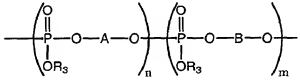
62. A method of claim 61, wherein gene therapy occurs *in vivo*.

63. A method of claim 61, wherein gene therapy occurs *in vitro*.

64. A method of claim 61, wherein the biodegradable polymer has between about 5 and about 2,000 phosphate groups.

65. A method of claim 61, wherein the biodegradable polymer has a molecular weight of between about 1000 and 1,000,000

66. A method of claim 61, wherein the polymer comprises repeat units of the formula:



wherein

A and B can be the same or different and are each independently selected from the group consisting of $C_{1\text{-}20}$alkylene, $C_{3\text{-}20}$cyclic alkylene, $C_{5\text{-}20}$arylene, $C_{5\text{-}20}$heteroarylene, $C_{3\text{-}20}$cyclic heteroalkylene, a hydrophilic divalent linker group, and $(CH_2CH_2O)_xCH_2CH_2$, such that A, B or both A and B comprise a positively charged or positively chargeable functional group in the mainchain and A, B or both A and B can be optionally substituted with one or more neutral or charged hydrophilic groups or hydrophobic groups;

$R_3$ is $C_{1\text{-}20}$alkyl, $C_{5\text{-}20}$aryl, $C_{5\text{-}20}$heteroaryl, $C_{3\text{-}8}$heteroalicyclic, $C_{3\text{-}8}$cycloalkyl, $C_{7\text{-}20}$aralkyl or $C_{3\text{-}8}$cycloalkyl $C_{1\text{-}20}$alkyl; and

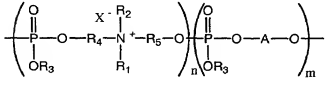
each occurrence of $R_3$ can be optionally substituted with one or more neutral or charged groups or one or more hydrophobic moieties;

x is an integer between about 1 and about 100;

m and n are independently selected non-negative integers; and

$m + n \geq 1$.

67. A method of claim 66, wherein the polymer comprises repeat units according to the formula:



wherein

$R_4$, $R_5$ and A are each independently chosen from the group consisting of $C_{1-20}$alkylene, $C_{3-20}$cycloalkylene, divalent neutral or charged hydrophilic moieties, -$(CH_2CH_2O)_xCH_2CH_2$-;

x is an integer from 1 to about 100;

$R_1$ is hydrogen, $C_{1-36}$alkyl, $C_{2-36}$alkenyl, $C_{2-36}$alkynyl, $C_{3-20}$cycloalkyl, $C_{3-8}$cycloalkyl$C_{1-36}$alkyl, $C_{7-18}$aralkyl, $C_{3-20}$heteroalicyclic, or $(CH_2)_a$-Y-Z group;

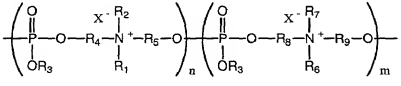
Y is an -O-, -$CO_2$-, -$NHCO_2$-, or -$OCO_2$- functional group;

Z is $C_{1-36}$alkyl, $C_{2-36}$alkenyl, $C_{2-36}$alkynyl, $C_{3-20}$cycloalkyl, $C_{3-8}$cycloalkyl$C_{1-36}$alkyl, $C_{7-18}$aralkyl, poly(ethylene glycol)- $C_{1-36}$alkyl ether or a steroid derivative;

$R_2$ is absent, hydrogen, $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, or $C_{3-8}$cycloalkyl $C_{1-36}$alkyl; and

$X^-$ is a biocompatible anion.

68. A method of claim 61, wherein the polymer comprises repeat units according to the formula:



wherein

$R_4$, $R_5$, $R_8$ and $R_9$ are independently selected at each occurrence from the group consisting of $C_{1-36}$alkylene, $C_{5-36}$cycloalkylene, and poly(ethyleneglycol) alkyl ether, each occurrence of $R_4$, $R_5$, $R_8$ and $R_9$ can be optionally substituted with a neutral or charged hydrophilic group selected from the group consisting of hydroxyl, hydroxy $C_{1-8}$alkyl, amino $C_{1-8}$alkyl, N- $C_{1-8}$alkyl amino $C_{1-8}$alkyl, N,N-di $C_{1-8}$alkyl amino $C_{1-8}$alkyl, amino, N- $C_{1-8}$alkylamino, N,N,di $C_{1-8}$alkylamino, N,N,N-tri $C_{1-8}$alkylamino, amide, carboxylate, sulfate, and phosphate;

$R_2$ and $R_7$ are each independently at each occurrence either absent or are selected from the group consisting of hydrogen, $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, and $C_{3-8}$cycloalkyl $C_{1-36}$alkyl;

$R_3$ is $C_{1-36}$alkyl, $C_{3-20}$cycloalkyl, $C_{3-20}$heteroalicyclic, $C_{7-18}$aralkyl, or $C_{3-8}$cycloalkyl $C_{1-36}$alkyl;

$R_1$ and $R_6$ are each independently selected groups chosen at each occurrence from the group consisting of hydrogen, $C_{1-36}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

Z is alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

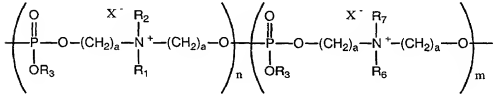
$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen and $C_{1-6}$alkyl;

b is a positive integer;

m+n≥1; and

n≥1.

69. A method of claim 68, wherein the polymer comprises repeat units according to the formula:



wherein

$R_2$ and $R_7$ are each independently selected at each occurrence to be absent, hydrogen or $C_{1-20}$alkyl;

$R_1$ and $R_6$ are each independently selected at each occurrence to be hydrogen, $C_{1-36}$alkyl or $(CH_2)_b$-$N(R_{10})CO_2$-Z;

$R_{10}$ is independently chosen at each occurrence to be hydrogen or $C_{1-6}$alkyl;

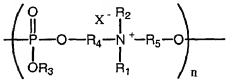
Z is independently chosen at each occurrence of Z to be alkyl, $(CH_2CH_2O)_xCH_2CH_3$ or a steroid derivative;

a is an positive integer;

b is a positive integer; and

x is an integer from about 1 to about 20.

70. A method of claim 61, wherein the polymer comprises repeat units according to the formula:



wherein

$R_1$ is independently selected groups chosen at each occurrence from the group consisting of hydrogen, $C_{1\text{-}36}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

Z is $C_{1\text{-}36}$alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

$R_2$ is independently selected at each occurrence to be absent, hydrogen, or a $C_{1\text{-}36}$alkyl;

$R_3$ is $C_{1\text{-}36}$alkyl;

$R_4$ and $R_5$ are each independently chosen from the group consisting of $C_{1\text{-}36}$alkylene, $C_{3\text{-}36}$cycloalkylene, divalent neutral or charged hydrophilic moieties, $-(CH_2CH_2O)_xCH_2CH_2-$;

$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen and $C_{1\text{-}6}$alkyl;

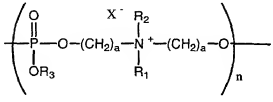
x is an integer from about 1 to about 100;

$X^-$ is a biocompatible anion;

b is a positive integer; and

n is an integer between about 5 and about 2,000.

71. A method of claim 70, wherein the polymer comprises repeat units according to the formula:



wherein

$R_2$ and $R_3$ are each independently selected $C_{1\text{-}6}$alkyl groups;

$R_1$ is independently selected groups chosen at each occurrence from the group consisting of $C_{8\text{-}24}$alkyl, poly(ethylene glycol) alkyl ether, $(CR_{10}R_{11})_b$-Y-Z;

Y is $-OCO_2-$ or $-NR_{10}CO_2-$;

Z is $C_{1\text{-}36}$alkyl, poly(ethylene glycol) alkyl ether or a steroid derivative;

$R_{10}$ and $R_{11}$ are each independently selected at each occurrence from the group consisting of hydrogen, methyl and ethyl;

$X^-$ is a biocompatible anion;

a is an positive integer;

b is a positive integer; and

n is an integer between about 5 and about 2,000.